

## Original Article

# A history of traditional Chinese medicine and its current role in urolithiasis

CHEN Shijun<sup>1</sup>, GU Di<sup>1</sup>, L.J. TAY<sup>2</sup>, Robert GRAY<sup>2</sup>, JING Tao<sup>3</sup>, CHEN Dingnan<sup>1</sup>, ZHENG Shaobin<sup>1</sup>, Peter THOMPSON<sup>2</sup>

<sup>1</sup>Department of Urology, Nanfang Hospital, Southern Medical University, Guangzhou 510515, China; <sup>2</sup>Department of Urology, King's College Hospital, London WC2R 2LS, UK; <sup>3</sup>Department of Urology, The Affiliated Hospital of Qingdao University, Qingdao 266003, China

**Abstract: Objective** To trace the history of TCM, its concept and the evaluate its role in the management of renal stones. **Methods** References were retrieved following a thorough bibliographic search using OVID Medline, EMBASE, Cochrane Database. Keywords used included 'traditional chinese medicine', 'urolithiasis', 'calculi', 'herbal medicine', 'kampo', 'kidney'. Relevant review articles, case reports, books were considered along with resources from the Wellcome Trust Collection, Royal Society of Medicine, London. **Results** TCM has been in existence for over 2500 years. It broadly consist of acupuncture, herbal medicine, tuina (massage) and qi gong. The earliest documentation of Chinese herbal medicaments is in the 'Shen Nung Benchau Jing', believed to be compiled during the Han Dynasty. Historically, it had an extensive role in treatment of chronic diseases, and has been widely used in China and Japan (known as Kampo) for 10 decades, until the introduction of Western medicine in the late 1800s. TCM is popular within urology, including herbal 'ginseng' for the treatment of erectile dysfunction, acupuncture and herbal therapy for overactive bladder and renal stones. In TCM, dysfunction of Qi in the bladder causes damp-heat to diffuse downward and accumulate in the urinary system, over time causing calculus formation. Urolithiasis causing obstruction is believed to block the flow of Qi and therefore result in pain. Haematuria is attributed to the calculus injuries to the meridian. Currently, there is limited but growing evidence based literature on the role TCM in the prevention and treatment of stones. The Chinese State Medicine Administration Bureau issued guidelines in 1994 for management of urolithiasis. It categorized it into four syndromes, each with different modes of treatment (Damp heat retention syndrome, qi-stagnation blood stasis syndrome, kidney ying deficiency syndrome and kidney yang deficiency syndrome). Recent evidence showed that medicinal herbs are known to effectively increase the rate of calculus passage, decreased the complications of urolithiasis, which indirectly reduces hospitalisation and cost. **Conclusion** From its primitive roots in China, TCM now has a global influence, and we need to recognise the complementary role it plays in urological practice.

**Key words:** urolithiasis; traditional Chinese medicine; treatment

In China, traditional Chinese medicine (TCM) has been used more than thousands of years dealing with human treatment and prevention of diseases. This essay is going to briefly introduce the treatment of urolithiasis in TCM and its mechanism which has been proved under modern scientific research.

TCM is a unique, integral system which was generated through the experience of the Chinese people in their long struggle against diseases. Its theoretical system was greatly influenced by ancient Chinese materialism and dialectics. Briefly speaking, TCM takes the four diagnostic methods: inspection, auscultation and olfaction inquiry, pulse-taking and palpation as its principle techniques, using the differentiation of syndromes which based on the theory of 'Zang-Fu', 'Six-Meridian' and 'Wei, Qi, Ying and Xue' as its guideline and basic theories. Its therapeutic principles are 'treating aiming at its pathogenesis', 'strengthening vital Qi to eliminate pathogenic factor', 'coordinating yin and yang' and "treatment in accordance with seasonal conditions, local conditions and patients individuality".

## MATERIALS AND METHODS

References were retrieved following a thorough bibliographic search using OVID Medline, EMBASE, Cochrane Database. Keywords used included 'traditional chinese medicine', 'urolithiasis', 'calculi', 'herbal medicine', 'kampo', 'kidney'. Relevant review articles, case reports, books were considered along with resources from the Wellcome Trust Collection, Royal Society of Medicine, London.

## RESULTS

Urolithiasis is called "stone urinate" in TCM references. Symptoms of this disease include stone in urine, painful urination, and lower abdominal pain with radiation to the umbilical region. TCM believes that its pathogenesis is the dysfunction of Qi in bladder, making the damp-heat diffuse downward and accumulate in urinary system, and then affect the urine and gradually form the calculus in kidney, ureter and bladder. When

the urinary tract is blocked, the Qi-flowing is then obstructed and generate pain. When the calculus injury the meridian, the blood come out from the impaired meridian and cause hematuria.

In many Chinese societies, medicinal herbs are widely used in the prevention and treatment of urolithiasis. In 28 Jun 1994, "State Chinese Medicine Administration Bureau" in China has issued the guideline of "stone urinate" and classified it into four different sub-types as follows:

#### *Damp-heat Retention Syndrome*

Clinical features: lumbago or lower abdominal pain, or interruption of urinary flow, urinary frequency, urgency, painful urination, cloudy urine or hematuria; can associated with aversion to cold, fever, thirsty, red tongue, yellow and greasy of tongue-coating, wiry and hasty pulse.

Management: clearing heat and draining damp, relieving strangury and removing calculus.

Representative prescription and formula: "Sanjing remove calculus decoction" (herbal composition can be adjusted according to syndrome differentiation): Desmodium 60 g, Lygodium 60 g, Ventriculi galli mucosa 12 g, Plantago seed 12 g, Pyrrosia lingua 12 g, Chingma abutilon seed 9 g, Talcum(bag) 15 g.

#### *Qi-stagnation Blood Stasis Syndrome*

Clinical features: Disease progress rapidly, lumbar and abdominal colic pain with radiation to the perineal region, urinary frequency, urgency, yellow or red urine, deep-red tongue or ecchymosis on the tongue, wiry or choppy pulse.

Management: regulating the flow of Qi and activating blood, relieving strangury and removing calculus.

Representative prescription and formula: "Jinglingzi powder mix with Shiwei powder": Chinaberry fruit 30 g, Corydalis tuber 30 g, Pyrrosia lingua 60 g, Zhai weat 30 g, Plantain seed 90 g, Chingma abutilon seed 60 g, Talcum 150 g.

#### *Kidney Yin Deficiency Syndrome*

Clinical features: lumbar and abdominal swelling pain or dull pain, dribbling and discomfortable urinate, yellow or red urine, associated with dizziness and tinnitus, insomnia and dreamful sleep, or dysphoria and chest plams-soles, dry eye, red tongue, thread and hasty pulse.

Management: nourishing yin and clearing heat, relieving strangury and removing calculus.

Representative prescription and formula: "Zhibodihuang pill mix with Erzhi pill": Fructus ligustri lucidi 30 g, herba celiptae 30 g, Rehmannia glutinosa libosach 15 g, Chinese yam 15 g, Asiatic cornelian cherry fruit 15 g, Rhizoma anemarrhenae 15 g, Poria cocos 15 g, Cassia twig 15 g, The root of bidentate achyranthes 15 g, Plantain seed 15 g, Tree peony bark 12 g, Licorice root 6 g.

#### *Kidney Yang Deficiency Syndrome*

Clinical features: Urinary calculus with a long history, cannot be removed, lumbar swelling pain from time to time, exacerbation when overworked, uropenia, associated with lassitude and fatigue, or slight puffy swelling face, pale tongue, thin tongue-coating, thread and weak pulse.

Management: warming and recuperating kidney yang, relieving strangury and remove calculus

Representative prescription and formula: "Shenqi pill": Desmodium 30 g, Lygodium 30 g, V entriculi galli mucosa 30 g, Astragalus membranaceus 30 g, Cuscuta chinensis 20 g, Pyrrosia lingua 20 g, fructus aurantii 15 g, Eucommia ulmoides 15 g, Salvia miltiorrhiza 15 g, Pangolin 15 g, Cistanche herba 15 g, Bighead atractylodes rhizome 15 g, Fructus psoraleae 10 g, Licorice root 6 g.

In the recent years, many modern scientific researches, both in vivo or in vitro, have been applied to study the mechanism of how TCM's herbs work. For example, as a widely used herb for anti-urolithiasis, Desmodium can up-regulates urinary citrate excretion, promotes the formation of soluble calcium citrate which can consume calcium ions and therefore result in the reduction of urinary calcium. Also, its diuretic action can attenuate the concentration of Calcium and Oxalate and inhibits crystal retention. Furthermore, the flavonoid in the extract of Desmodium can protect urinary epithelium cells against damage effect of ROS and the increased expression of Osteopontin<sup>[1]</sup>. We have a brief conclusion below about some of the pharmacological actions of the medicinal herbs: (1) Desmodium styracifolium<sup>[2]</sup>, rhubarb<sup>[3]</sup> could increase ureteral peristalsis; (2) Desmodium styracifolium<sup>[4]</sup>, rhubarb<sup>[5]</sup>, the root of bidentate achyranthes<sup>[6]</sup>, bighead atractylodes rhizome<sup>[7]</sup>, Erica multiflora flowers<sup>[8]</sup>, Cynodon dactylon rhizomes<sup>[9]</sup>, Poria cocos<sup>[10]</sup> have pharmacologic action of diuresis; (3) Plantain<sup>[11]</sup>, Alisma rhizome<sup>[12]</sup>, Desmodium styracifolium<sup>[13-14]</sup>, Orthosiphon stamineus and Cystone<sup>[15]</sup> could decrease calcium oxalate crystallization; (4) Houltuynia cordata<sup>[16]</sup>, Sichuan lovage rhizome<sup>[17]</sup>, salviae miltiorrhizae<sup>[15]</sup>, Radix Paeoniae Rubra<sup>[16]</sup>, Desmodium styracifolium<sup>[1, 17]</sup> possess pharmacologic action of antiseptis and anti-inflammation.

## CONCLUSION

In the Chinese urology clinic, TCM's herbs are thought to be effectively increase calculi expulsion rate and decrease expulsion duration, complications, medical costs, and hospitalization rate. It currently plays as a synergistic role of the intracavitary minimally invasive surgery and ESWL in the treatment of urolithias. Since most of the active constituents of the medicinal herbs remain unclear, further research is needed to identify their biological activity and interaction.

## REFERENCES

- [1] Mi J, Duan J, Zhang J, et al. Evaluation of antiurolithic effect and the

- possible mechanisms of *Desmodium styracifolium* and *Pyrrosiae petiolosa* in rats[J]. *Urol Res*, 2012, 40(2): 151-61.
- [2] Addy ME, Burka JF. Effect of *desmodium adscendens* fraction 3 on contractions of respiratory smooth muscle [J]. *J Ethnopharmacol*, 1990, 29(3): 325-35.
- [3] Cui XN, Li YB, Li Y. Effects of herbs capable of activating blood circulation or inducing diuresis on the expressions of tumor necrosis factor- $\alpha$ , nuclear factor- $\kappa$ B, and aquaporin-4 in rats with intracerebral hemorrhage [J]. *Chinese Journal of Integrated Traditional and Western Medicine*, 2012, 32(2): 203-8.
- [4] Feng Y, Qiu Y, Zhou X, et al. Optimizing prescription of Chinese herbal medicine for unstable angina based on partially observable markov decision process[J]. *Evid Based Complement Alternat Med*, 2013(12): 532-4.
- [5] Shao Z, Li J, Zhao Z, et al. Effects of tetramethylpyrazine on nitric oxide/cGMP signaling after cerebral vasospasm in rabbits [J]. *Brain Res*, 2010, 1361(32): 67-75.
- [6] Aggarwal A, Singla SK, Gandhi M, et al. Preventive and curative effects of *Achyranthes aspera* Linn. extract in experimentally induced nephrolithiasis[J]. *Indian J Exp Biol*, 2012, 50(3): 201-8.
- [7] Satoh K, Yasuda I, Nagai F, et al. The effects of crude drugs using diuretic on horse kidney ( $\text{Na}^+ + \text{K}^+$ )-adenosine triphosphatase [J]. *Yakugaku Zasshi*, 1991, 111(2): 138-45.
- [8] Sadki C, Hacht B, Souliman A, et al. Acute diuretic activity of aqueous *Erica multiflora* flowers and *Cynodon dactylon* rhizomes extracts in rats[J]. *J Ethnopharmacol*, 2010, 128(2): 352-6.
- [9] Zhao YY, Feng YL, Du X, et al. Diuretic activity of the ethanol and aqueous extracts of the surface layer of *Poria cocos* in rat [J]. *J Ethnopharmacol*, 2012, 144(3): 775-8.
- [10] Devi VK, Baskar R, Varalakshmi P. Biochemical effects in normal and stone forming rats treated with the ripe kernel juice of plantain (*musa paradisiaca*) [J]. *Anc Sci Life*, 1993, 12(3/4): 451-61.
- [11] Yasui T, Fujita K, Sato M, et al. The effect of takusha, a kampo medicine, on renal stone formation and osteopontin expression in a rat urolithiasis model[J]. *Urol Res*, 1999, 27(3): 194-9.
- [12] Hirayama H, Wang Z, Nishi K, et al. Effect of *desmodium styracifolium*-triterpenoid on Calcium oxalate renal stones [J]. *Br J Urol*, 1993, 71(2): 143-7.
- [13] Rodgers AL, Webber D, Ramsout R, et al. Herbal preparations affect the kinetic factors of Calcium oxalate crystallization in synthetic urine: implications for kidney stone therapy[J]. *Urolithiasis*, 2014, 42 (3): 221-5.
- [14] Kumar M, Prasad SK, Hemalatha S. A current update on the phytopharmacological aspects of *Houttuynia cordata* Thunb [J]. *Pharmacogn Rev*, 2014, 8(15): 22-35.
- [15] Chen J, Deng J, Zhang Y, et al. Lipid-lowering effects of Danhong injection on hyperlipidemia rats[J]. *J Ethnopharmacol*, 2014, 154(2): 437-42.
- [16] Wang L, Yang CL, Or TC, et al. Differential effects of *Radix Paeoniae Rubra* (Chishao) on cytokine and chemokine expression inducible by mycobacteria[J]. *Chin Med*, 2011, 6(1): 14-7.
- [17] Zhu ZZ, Ma KJ, Ran X, et al. Analgesic, anti-inflammatory and antipyretic activities of the petroleum ether fraction from the ethanol extract of *Desmodium podocarpum* [J]. *J Ethnopharmacol*, 2011, 133 (3): 1126-31.

## 中国传统医学在泌尿系结石疾病中的应用

陈始均<sup>1</sup>, 古 迪<sup>1</sup>, L.J. TAY<sup>2</sup>, Robert GRAY<sup>2</sup>, 荆 涛<sup>3</sup>, 陈定南<sup>1</sup>, 郑少斌<sup>1</sup>, Peter THOMPSON<sup>2</sup>

<sup>1</sup>南方医科大学南方医院泌尿外科, 广东 广州 510515; <sup>2</sup>英国伦敦国王学院医院泌尿外科, 英国 伦敦 WC2R 2LS; <sup>3</sup>青岛大学附属医院泌尿外科, 山东 青岛 266003

**摘要:**目的 追溯中国传统医学的核心理念及其历史, 评估其在学习肾结石方面扮演的重要角色。方法 从以下几个数据库搜集相关所有文献资料: OVID Medline, EMBASE, Cochrane 数据库。关键词包括“中国传统医学”、“尿石症”、“结石”、“中药”、“汉方医学”、“肾”。查找到的相关综述、病例报告和书籍均来源于英国伦敦皇家医学学会的惠康基金会藏书资源。结果 中国传统医学已经存在了2500多年。它由针灸学、中药学、推拿学和气功学组成。现存最早的中药学专著是《神农本草经》, 约成书于汉代。纵观中国历史, 在治疗慢性病方面, 本书扮演了极重要的角色, 且在中国和日本(即“汉方医学”)广泛应用了数十年, 直到18世纪后期西方医学的引入。中国传统医学在泌尿外科学方面广受欢迎, 包括用中药“人参”治疗勃起功能障碍, 用针灸和中药联合治疗膀胱过度活动症和肾结石。在中国传统医学的观点中, 膀胱气化失调引起了湿热向下扩散并累积到泌尿系统, 日积月累引起了结石形成。尿石症阻滞了气的流动, 引起了疼痛。而血尿源于结石对经络系统的损伤。目前, 中国传统医学在预防和治理肾结石方面的文献证据虽有限, 但日益增长。1994年, 中国国家医药管理局就治疗尿石症发布了指南, 指南将尿石症分型为4种(湿热蕴结型, 气滞血瘀型, 肾阴不足型和肾阳不足型), 每种症状的治疗方式都不同。近年来的证据表明中医药能有效增加结石排出率, 减少尿石症的并发症形成, 这些能间接减少住院时间及花销。结论 中国传统医学的根源来自于中国传统文化, 现在逐渐有了世界范围内的影响力, 我们要认可其在泌尿外科学临床实践过程中起到的重要补充作用。

**关键词:** 尿石症; 中国传统医学; 治疗

收稿日期: 2016-04-25

基金项目: 广东省自然科学基金(2014A030310479)

作者简介: 陈始均, 博士, E-mail: shijunchenathena@qq.com

通信作者: 古 迪, E-mail: sveong@163.com